MUSICAL INSTRUMENTS AT SOUTH KENSINGTON

A Descriptive Catalogue of the Musical Instruments in the South Kensington Museum. Preceded by an Essay on the History of Musical Instruments. By Carl Engel. Second Edition.

THE collection of musical instruments in the Museum at South Kensington is one of considerable and of varied interest. Consisting, as it does mainly, of the instruments employed by various nations within the last few centuries, it exemplifies the improvements in art and the gradual development of scientific principles in construction. But it includes also instruments of more remote dates such as would range within "the middle ages," and a few of prehistoric period. In the last case a similarity of musical instruments and of musical systems may be an important assistance in determining the ethnology of an extinct people, while the practice of opposite systems by neighbouring races will be a strong inference that they sprung from different stocks.

The excellent Catalogue, of which we have now a second edition, includes a prefatory essay by M. Carl Engel on the early history of musical instruments, and he has enhanced its utility by adding the scale of notes which many of the instruments would produce. This was practicable in the case of pipes, flutes, or other wind instruments from extant examples, but not with such as were stringed, because they would not remain in tune.

When a nation is found to have employed instruments constructed for the diatonic octave scale, such as the intervals of our A B C D E F G A, it is a proof that the possessors practised harmony, although it may have been but to a limited extent. The reason is that the fourth and seventh notes of such scales require different basses to the others, and would not be agreeable to the ears without the addition of such basses. On the other hand, if we find a scale of but five notes within an octave, the two omitted will be the fourth and seventh of the scale on that very account. We may in such cases conclude with safety that melody was the chief attraction to the people, and that harmony was either unknown or little appreciated.

We should bear in mind that the most ancient recorded *octave* scale of Greece and of Northern Asia and Africa is the minor; but there may have been exceptional cases of the use of the major, because the ancient Greeks had a five-note major as well as a five-note minor scale in their chromatic system. Nevertheless, it can have been but little practised by them in early ages because it was never admitted into their precepts. There is no Greek treatise upon music which includes the major scale; and yet the transition from one to the other was most easy, for whoever begins upon the third note, instead of the first, of any minor scale, will transform it into its "relative" major. These are the particular points to be borne in mind in estimating remote dates for musical instruments.

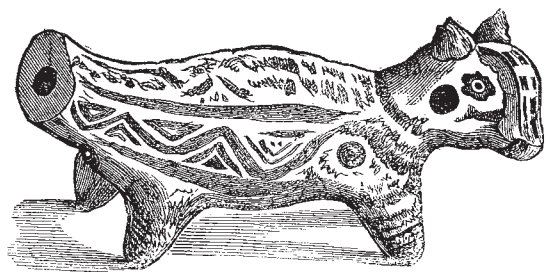

FIG. 1.—Ancient Pipe of the Chiriqui. (Centra America.)

And now to apply these principles to three of the instruments of different races discovered in Central and in South America. Among the ancient graves of the Chiriqui in Central America small pipes and whistles of pottery, which produce several sounds, have been found, of which one has six finger-holes, but in that case the notes have not been ascertained, while others have four notes, E F G A. These form the ancient Greek tetrachord, and the Greeks acquired their knowledge of music from the nations of Northern Asia and Northern Africa, especially from Egyptians, Chaldæans, and Phœnicians. Can any one of these nations have been in contact with the Chiriqui of Central America? The scale is fitted for chanted recitations rather than sufficient for music proper. F would be the chanting note of the above, with the power of ascending, for expression, to G and A, and with that of descending to the major seventh, E in preparing for a close. In this sense the notes are pure, good, and

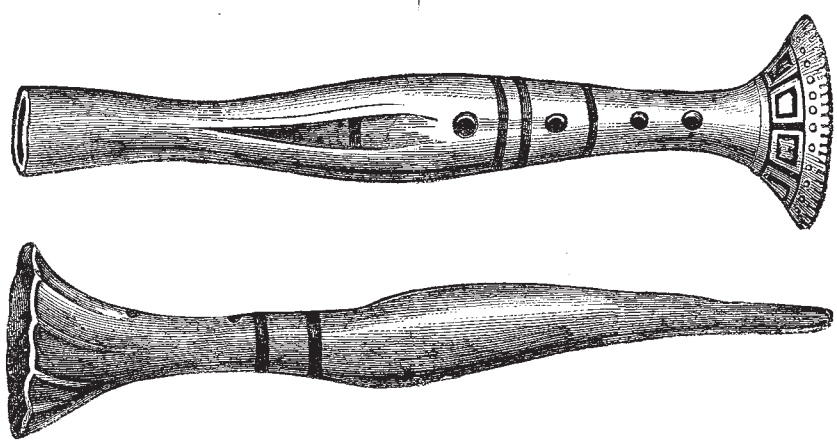

FIG. 2.—Pipes of the Aztecs.

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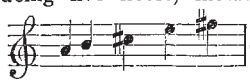
true parts of a major scale. They are such as a correct musical ear would dictate, but they tell little as to the cultivation of music.

Upon the same page (67) M. Engel passes on to the *Pitos* (of the flageolet kind) used by the Aztecs. These are of reddish pottery, having four finger-holes, and producing five notes, including the open note of the pipe  . Several examples are in the British Museum. Although Pitos vary in size they have all the same pitch of sound, says M. Engel, and are easy to blow. They have but five notes to the octave, in the major scale, and this has been popularly called "The Scotch Scale." M. Engel terms it *pentatonic*, but, if it must needs have a Greek name, we prefer *pentaphōnic*, since two of the intervals for an octave scale are of minor thirds. The points to be remarked in these Pitos are that the various lengths should have been so proportioned as to be of the same pitch, and that the scale should be major. We may say of the Aztecs, as of the Chiriqui, that the practice of harmony did not obtain among them, but the Aztecs had advanced further in the direction of melody, and had in all probability a custom of playing many pipes together in unison. They were also advanced in the manufacture of pottery. It is often convenient to suppose that a people is "indigenous," and it may have been so for many centuries, but the speculation for ethnologists is "Whence originally came the Aztecs?"

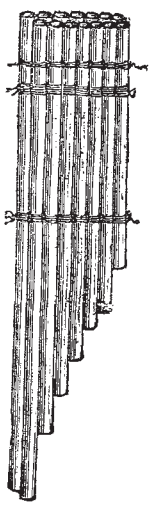
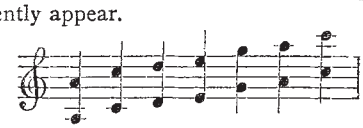


FIG. 3.—Huayra-puhura of the Inca Peruvians.

The third case is of the Inca Peruvians (p. 70). They had a Syrinx, or Pandean pipe, which played in octaves. The seven double pipes were of equal length, but the one pipe was closed at the end, and its fellow open. When M. Engel says: "The reader is probably aware that the closing of the pipe at the end *raises* its pitch an octave," it is an error in writing—he means that closing the end *lowers* its pitch an octave. The Peruvian Syrinx is *pentaphonic* in the key of C major. The scale is printed as beginning with the octaves of A, which we suspect to be a misprint for B, and the reason will presently appear.



Another instrument of the same class "was discovered placed over a corpse in a Peruvian tomb, and was procured by the French general Paroissien." The scale of this set of pipes, as given by M. Engel, is as follows:—

It commences with E, the major Seventh below F, the key-note, just as we suppose the preceding pipes should have been given. It then forms an ascending chromatic scale of F to the extent of an octave, excluding only the Fourth and the *minor* Seventh of the scale. The reason is evidently because those two are not good melodic intervals. They require their own basses to render them agreeable to the ear, and the instrument does not include

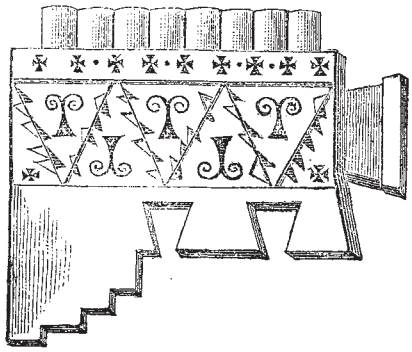


FIG. 4.—Huayra-puhura of the Inca Peruvians.

a bass. On the other hand the *major* Seventh, or semitone below the key-note, is included. It is a good melodic interval, and the French term it *la note sensible*. The only tone above the octave is A, which adds to the instrument a run over the common chord of A major.

This is a remarkable and an excellent melodic scale, which has not been duly appreciated by M. Engel. He says: "The musician is likely to speculate what could have induced the Peruvians to adopt so strange a series of intervals—indeed it seems rather arbitrary than premeditated."

A little reflection upon the intervals of the harmonic, or natural, scale would have satisfied M. Engel that these Peruvians had exceptionally correct ears for music. It is not, as he supposes, any "natural predilection for that series of intervals which may be called the pentatonic scale, *because* it contains only five different intervals in the compass of an octave" (p. 311) but, "because" the two omitted notes are unsatisfactory to the ear in unaccompanied melody. They are "irrational" intervals, and therefore they have been rejected by nations in all quarters of the globe, Scotch and Irish, Egyptians, Chinese, Malays, Peruvians, Aztecs, and others. Even Europeans, who cultivate harmony, reject the minor seventh in minor scales.

M. Engel has fulfilled a laborious duty with great industry and ability. A more intricate subject than the ever-changing names of the musical instruments of past ages could scarcely be found. It is next to impossible that it should be quite perfect. Sometimes the names of instruments were changed without any appreciable reason, and, in many cases, those names were absurdly misplaced. For instance, an Italian monochord for measuring intervals was called *tromba marina*, and was translated into English as a "trumpet marine." Dr. Burney not unnaturally assumed that it must have been a trumpet made of a shell, like the Triton's conch, but it consisted of three long pieces of wood, glued together triangularly and it had one string to be sounded by a bow. Again, as to the guitar in Spain. It had but four strings until about the sixteenth century, and then, seeing that foreign

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viols had six strings, the Spaniards increased the number upon their guitars to six, and termed them vihuelas, without adopting the distinctive feature of the viol—the bow. "No es otra cosa esta guitarra sino una vihuela quitada la sexta y la prima cuerda," says Juan Bermudo, in 1555,—"This guitar is no other than a vihuela deprived of its first and sixth string"—but M. Engel has, by mistake, given the name of vihuela to the earliest guitars with four strings, as upon the portico of the church of Sant-Jago di Compostella, and others. In England, in the sixteenth century, the vihuelas were termed Spanish viols, and are so named among the musical instruments left by Henry VIII., but eventually they were reinstated in the name of *Spanish* guitars, while the old English cittern, strung with wire, and the number of strings increased from four to six (single or double), was *the* guitar of the last century. M. Engel has not recognised this change. The English had also a small instrument with four catgut strings, very like the four-stringed Spanish guitar called the gittern, or ghittern. It differed chiefly from the Spanish instrument in having a lute-shaped back instead of a flat one. M. Engel does not explain how this instrument differed from the guitar, although he has given to another its Latinised name, quinterna or guinterna.

Again, it is not in accordance with English usage to term large pieces of bamboo partially split, in order that, by shaking them, the sides may be rattled together, "castanets;" neither were castanets called *crotala* by the ancients, as M. Engel supposes. The ancient castanets were made of nut-shells, cockles, oyster-shells, or small pieces of metal, and were called *krembala*. "And beating down the limpets from the rocks," says Hermippus, "they made a noise like castanets" (κρεμβαλίζουσι). The *krotala* were maces and other large and loud rattles to be used in the worship of Cybele. Sometimes the two parts were detached and held in two hands, and sometimes they had a hinge or spring at one end, to be sounded by closing the hand suddenly so as to knock one against the other. The stork was called *crotalistria*, from the noise made by the bird in striking together the two bones of its beak.

M. Engel's history is a little at fault when he writes that "The earliest organs had only about a dozen pipes," and that "The largest, which were made about 900 years ago, had only three octaves, in which the chromatic intervals did not appear" (p. 108). This passage must be looked upon only as a prelude, intended to magnify, by contrast, the improvements which have been made in Germany and other parts of the Continent of late years. It can have no other meaning—for the organ at Winchester had 400 pipes in the tenth and eleventh centuries. It is fully described by a contemporary musician, the author of a once celebrated, but now lost, treatise, *De Tonorum Harmonia*. Two lines of extract will suffice:—

> "Sola quadringentas quae sustinet ordine musas,
> Quas manus organici temperat ingenii."
>
> Wolstan's *Life of St. Swithun*.

M. Engel makes also a mistake of from 400 to 500 years in the date of a manuscript, and, acting upon this mistake, he claims priority for Germany over England for the first use of the fiddle-bow. Strings have but a fleeting tone, unless it be sustained by friction, and the principle is so simple as to be intelligible at one glance, and therefore to be readily adopted. But the first example yet discovered is in an Anglo-Saxon MS. of the earlier half of the eleventh century, where one gleeman is playing the fiddle while another is throwing up and catching three balls in rotation (Cotton MS., Tiberius, c. vi.). This is the figure with the primitive fiddle:—

FIG. 5.—Anglo Saxon Fiddle. XIth Century. (British Museum.)

It will be seen that the shape of the body of the instrument prevents the use of the finger-board for the production of the higher notes, and to obviate this difficulty, a hole was subsequently made through the back, so that the performer's hand might have more command over the strings. In this form the Anglo-Saxon or early English name was *cruth*, Anglicè, *crowd*, a crowder and a fiddler being synonymous.

> "The fiddler's crowd now squeaks aloud," &c.

FIG. 6.—Crowd. English. About the XIIIth Century.

The third stage of improvement was to diminish the size of the body, to give it indented sides so as to allow free action to the bow, and lengthen the neck, as in the

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early English *citra*, *cetera*, or more modern *cittern*. "Fu la cetera usata prima tra gli Inglesi," says Galilei. Examples of instruments of this kind are frequent, but M. Engel startles us by exhibiting the following as an original "*German* Fiddle, IXth century, St. Blasius."

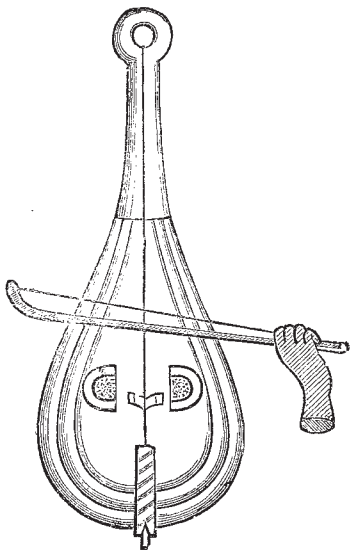

FIG. 7.—Fiddle String. XIIIth Century. (St. Blaise.)

The above is copied from Gerbert's "De Cantu et Musica Ecclesiæ," vol. ii., and is derived from a manuscript which was formerly in the monastery of St. Blaise, and which Gerbert describes as "about 500 years old!" (ex cod. San. Blas. annorum. circ. 500, p. 139) as he wrote in 1774. That would bring the date to the second half of the *thirteenth* century, instead of the eighth or ninth, as M. Engel states in his text. Moreover the plate is not intended to exhibit a fiddle, but a fiddle-*string*. It is called *lyra*, and the word is explained in two of the glossaries collected by Mr. T. Wright. A fiddle would have had more strings than one, in the thirteenth century, and the strings would have been fastened to pegs instead of a single string passed through a ring.

It will be seen from the above that the claims for Germany are put forth in the strongest light by M. Engel, and that other countries may not so readily acquiesce in them. We ourselves should raise many demurrers to his claims and conclusions, but they would apply to the prefatory essay and to the musical instruments of Europe, rather than to those of the rest of the world. While we cannot but wish that M. Engel's nationality had been less strongly developed, he is justly entitled to the credit of having ably fulfilled his commission, and of having exerted extensive research.

OUR BOOK SHELF

Notes on the Practical Chemistry of the Non-Metallic Elements and their Compounds. By William Procter, M.D., F.C.S., Lecturer on Chemistry at St. Peter's School, York. (London: Simpkin, Marshall, and Co. York: the Northern Educational Trading Co.)

THIS is a handbook on the Practical Chemistry of the Non-metallic Elements, designed to meet the requirements of pupils of Mechanics' Institutions, and of Science Classes of a similar kind. The true man of science welcomes every worthy means of spreading scientific truth, and does everything in his power to propagate that truth. He will regard with a jealous eye each work brought forward with a view of extending a knowledge of the sciences; and with a work intended for the use of a class whose opportunities of gaining knowledge are very limited, his scrutiny will be all the closer. A book written for the information of such should be couched in the simplest language, and the sense conveyed should be at once clear and comprehensive. In these respects Dr. Procter's little work cannot be termed a success. To use no stronger expression his language is frequently very vague. For example, on page 14 the author in speaking of "Chemical Affinity" says: "hence, in order that this force may be exercised by the particles coming within the sphere of each others' attraction, the substances must be in the state of liquid or gas." There can be but one way of understanding the latter part of this quotation, viz., that no chemical action can take place, unless the materials taking part in that action are each and all of them in a liquid or gaseous state. Dr. Procter is scarcely less happy in his definitions of bases, acids, &c. He says: "An acid is a compound of an electro-negative radical with hydrogen, which hydrogen it can exchange for a metal or basylous radical, and it is therefore replacable." Again, "A salt is a compound produced by the action of a base upon an acid with the displacement of the hydrogen of the latter." How can such definitions convey to the minds of pupils proper ideas of the true natures of acids and bases? Such explanations would not inappropriately be termed *indefinitions*. Chapters are devoted to chemical calculations, and chemical manipulations, and here doubtless the readers will find many useful hints for their guidance in the preparation of their apparatus, &c. In the body of the book Dr. Procter treats of the non-metallic elements, giving the ordinary methods of preparing them, and their compounds, and illustrating the characteristics of each by interesting and instructive experiments. A few pages devoted to the chemistry of water, qualitative analysis of gases, and the preparation of ordinary reagents, complete a book, which, designed for a good purpose, and containing much useful information, at the same time shows want of care in compilation, and also lacks lucidity. Printer's errors are much too numerous.

LETTERS TO THE EDITOR

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The Use of the Words "Weight" and "Mass"

Nothing could illustrate more forcibly the necessity of rendering definite the meaning of some of our present fundamental terms in connection with the science of dynamics, than a comparison of my letter to you on this subject (vol. xiii. p. 325) with the letter of Mr. Stoney, in reply to it (vol. xiii. p. 385), and that of Mr. Walker who follows Mr. Stoney.

When we who call ourselves teachers do not agree as to the signification of the most elementary terms we use, it is not to be wondered at, if those who come to learn should fail to attain clear ideas on a part of the science, where such confusion of nomenclature prevails.

My letter to you was for the purpose of pointing out an ambiguity of language, and of suggesting, in order to get rid of this ambiguity, not an alteration of the meaning of any word whatever, but a very simple *restriction* in the use of words, and the bringing into more frequent employment a very valuable old word—*gravity*—which has been lying ready for use but left almost idle. Mr. Stoney admits the ambiguity to be a very real one.

Mr. Stoney, however, says: "I fear Mr. Bottomley's remedy,

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